

DOCUMENT RESUME

ED 296 568

EC 210 338

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TITLE Improving the Perceptual Performance of Learning Disabled Second Graders through Computer Assisted Instruction.
PUB DATE 88
NOTE 73p.; Ed.D. Practicum I Report, Nova University.
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141) -- Dissertations/Theses - Practicum Papers (043)
EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Behavioral Objectives; *Computer Assisted Instruction; Concept Formation; Courseware; *Learning Disabilities; *Perceptual Development; Primary Education; *Program Effectiveness

ABSTRACT

The practicum designed a perceptual activities program for learning disabled second graders using computer-assisted instruction. The program develops skills involving visual motor coordination, figure-ground differentiation, form constancy, position in space, and spatial relationships. Five behavioral objectives for each developmental area were identified. Concepts developed by the program included direction, geometric design identification, reinforcement of keyboard dexterity, counting, mixed colors (hues), and upper and lower case letter identification and sequencing. Performance of the 10 students was evaluated before and after the program with the Marianne Frostig Developmental Test of Visual Perception. Eight of the students improved their perceptual quotient scores by at least five points. (Author/DB)

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Improving the Perceptual Performance
Of Learning Disabled Second Graders through
Computer Assisted Instruction

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Improving the Perceptual Performance
Of Learning Disabled Second Graders
Through Computer Assisted
Instruction

by

James P. Burke

Cluster XXVI-A

A Practicum I Report Presented to the Ed.D Program
in Early and Middle Childhood
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

NOVA UNIVERSITY

1988

MAR 8 1988

PRACTICUM APPROVAL SHEET

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ABSTRACT

Improving Perceptual Performance of Learning Disabled Second Graders through Computer Assisted Instruction. Burke, James Patrick., 1988: Practicum Report, Nova University, Ed.D. Program in Early and Middle Childhood. Descriptors: Computer Assisted Instruction/Microcomputer/Visual Impairments/Learning Disabilities/Learning Problems/Special Education/Exceptional Persons/Mainstreaming/Perceptual Handicaps/Resource Room Programs/Early Childhood Education/Primary Education/Elementary Education

This practicum was designed to enable perceptually impaired pupils to function successfully in the mainstream setting. The primary goal was to establish a functional and reliable perceptual activities program through Computer Assisted Instruction, from which the Special Education elementary level resource room teachers can emulate. The developmental areas included: visual motor coordination, figure-ground differentiation, form constancy, position in space, and spatial relationships. Five behavioral objectives were chosen related to each of the specific aforementioned areas.

The writer began the implementation by administering the Marianne Frostig Developmental Test of Visual Perception, to attain a pretest and a posttest perceptual quotient. The perceptual quotient is a deviation score obtained from the sum of subtest scale scores after correcting for age variation. The perceptual skills acquisition program concentrated on concepts as: direction, geometric design identification, reinforcement of keyboard dexterity, counting skills, mixed colors (hues), and upper and lower-case letter identification and sequencing.

The results of the practicum were positive. Analysis of the data revealed that eight of the ten male and female pupils improved their perceptual quotient scores by five points. Five exceeded perceptual quotient guides; three pupils by one point and two pupils by two points. Two pupils failed to improve by five points.

Objective two was related to visual-motor coordination. The specific objective was met by eight of the ten pupil participants. The third behavioral objective, related to figure-ground differentiation, was successfully completed by eight pupils. The fourth objective, a form constancy dexterity exercise, was perfectly executed by all in the pilot program. Objective five was completion of a human figure puzzle. This specific activity was met by six of the ten pupils. The final measurable objective, related to a spatial relationship activity, was met by eight of ten pupils.

CHAPTER I

INTRODUCTION

Description of Community

The facility in which the practicum was realized is an urban area located on an island. It is approximately 60 miles southeast of Philadelphia, and 100 miles southwest of New York City. It is the largest of four communities sharing the island. The four smaller communities serve as the city's suburbs. These cities each support their own elementary school system with one exception. Those pupils attend the neighboring school system.

The city's suburbs have no public high school. Their pupils attend the major city's high school as tuition pupils and constitute one-third of the enrollment.

Approximately ten years ago the total population of the city exceeded 47,000. Today, the population is in the vicinity of 40,000 with a projected population of 43,000 in 1990. Traditionally, this writer's city has been known as a summer resort and convention city. It became a casino city when casinos were approved by referendum on November 2, 1976. There are thirteen operating casinos in the city.

The community's twelve public schools consist of eight elementary schools K-6, one elementary school which houses Kindergartens, two junior high schools, grades 7 and 8, and one senior high school grades 9-12. The community has a school

population that exceeds 6,500 and a staff of over 500 teachers and administrators.

A majority of city residents are recipients of Welfare and Aid to Dependent Children (ADC) subsidies, living in high-and low-rise Government sponsored housing projects. The gaming industry is the employment mainstay of the adult majority. Fast food concessions and franchises, liberally stationed throughout the city and boardwalk-beach areas, employ the teen population.

Writer's Work Setting and Role

The school in which the practicum took place is in the South Inlet section of the city. This is the point at which the Atlantic Ocean and Brigantine Bay meet. While this writer operates out of the central Administration Building, it is one of seven schools serviced in his capacity as Learning Disabilities Teacher-Consultant. The writer and his immediate family are products of this area. Thirty years ago it was populated predominantly by those of Jewish and Irish heritage. Today it is vastly Hispanic. These Hispanic families are employed in casino housekeeping and kitchen pantry departments. Bilingual Hispanics are floorpersons, dealers, and restaurant servers. The South Inlet area is experiencing a resurgence phase. Spacious Victorian homes are being razed and newly constructed high-rises and townhouses are catering to the upper-income families. These condominiums and rentals are purchased as investments and summer domiciles. Thus, the immediate residents are not included in

this gentrification.

The pupils in the practicum project school are of low socioeconomic, single-parent stock. The pupil population is 343. Ten years ago the building housed over 900 pupils. The facility, too, has become an urban renewal, gaming casino casualty. Presently, there are 246 pupils of Hispanic ancestry, 81 Black, 15 Caucasian, and 1 Asian. The school building principal is of Hispanic origin. There are 24 teachers; 11 Caucasian, 7 Black, and 6 Hispanic. Three bilingual resource room teachers service the 50 Special Education pupils.

The writer, in his capacity as Learning Disabilities Teacher-Consultant, is responsible for assessing and analyzing pupil learning characteristics. This is accomplished through individual pupil testing. The standardized testing materials measure: reading grade level, mathematics grade level, auditory and visual strengths and weaknesses, and social skills strengths and weaknesses.

The writer further designs instructional strategies and plans educational programs. This is reflected in: the Individual Education Program (IEP) and the Teacher implementation conference with resource room teachers, regular classroom teachers, and parents.

Another responsibility of the writer is that of designing and choosing measuring tools in areas of tests and measurements. The children serviced are Child Study Team referrals and reevaluations, Kindergarten through Grade 12. These children

include: PreSchool Handicapped, Day Training Eligible, Court Case referrals, and Division of Youth and Family Services referrals.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

Special Education pupils, classified as Perceptually Impaired, had not received adequate instruction in order to address visual motor performance deficits. Pupils had been instructed by licensed Special Education teachers in reading rather than in perceptual deficiencies. According to the State of New Jersey Administrative Code (1984), "Resource room programs shall be instructional centers offering individual and small group instruction in place of regular classroom instruction."

In following the daily lesson plan, elementary level classroom teachers send the mainstreamed perceptually impaired pupils to the resource room for reading instruction. The elementary teachers are responsible for instructing and grading non-classified pupils; Special Education resource room teachers are responsible for instructing and grading classified pupils. Since September 1984, State implementation policy date, perceptually impaired pupils' reading levels have not exhibited adequate growth; nor have an adequate number of perceptually impaired pupils been declassified.

The writer questioned the contention of Special Education teachers that reading instruction alone consumes the entire period. It is the responsibility of the instructor to address

perceptual deficits in mainstreaming pupils. Reading and perceptual deficit instruction can certainly be consolidated into an appropriate lesson within a forty minute time frame.

The pupils classified as Perceptually Impaired at the beginning of grade one would remain at the readiness level for the entire school year. The end of the book test in the reading series would clearly show no growth. When classified pupils entered grade two, their reading levels would remain constant until the middle of the school term. At that juncture, perceptually impaired pupils would be at the beginning of the preprimer level. Each year, these mainstreamed pupils would fall further behind their classmates. The writer believes that this academic deficiency can be corrected. The Child Study Team, those who initially classify poor performing pupils, expect a greater percentage of perceptually impaired pupils to reenter the regular school program after having spent three years in the Special Education setting. A good basic skills foundation achieved through proper training and readiness activities would enable more pupils, those moderately disabled, to exit the Special Education program.

Ideally, elementary level perceptually impaired pupils should be able to perform academically once perceptual deficiencies have been diagnosed and then addressed. Each pupil should receive twenty minutes of visual perception instruction in one or more of the following areas: eye-motor coordination, figure-ground differentiation, form constancy, position in space,

and spatial relations. The remaining twenty minutes of the class period should be devoted to reading instruction according to the reading series and supervisors' guidelines. Presently, each Special Education instructor is familiar with the latter but negligent in the former; even though the Basic Plan of the IEP identifies the perceptual deficits of each classified pupil.

Problem Documentation

In order to provide documentaion of the problem stated in the previous section, the writer solicited the cooperation of the district Special Education, elementary level, resource room teachers. A questionnaire (see Appendix A) was distributed to each teacher. Twenty-five questionnaires were distributed and twenty-five were returned to the author. This represented a 100% return rate. The results of the entire questionnaire are presented in Appendix B. Yet, a brief discussion of selected questions is examined.

The writer, in authoring the questionnaire, primarily requested the teacher to indicate whether or not he/she employed perceptual acivities in a goal-oriented setting, whether or not he/she followed the Child Study Team's Basic Plan portion of the Individual Education Plan, and whether or not he/she fully comprehended the perceptual process.

In response to the statement "As a Special Education Resource Room teacher I aim visual perception instruction toward achievement of specific goals.", only 60% indicated sometimes did

they do so. Again, only 60% took into account individual levels, abilities, and needs of all pupils. These percentages veered toward a lack of perceptual process comprehension. This lack of comprehension was further noted by the response to the following statement "As a Special Education Resource Room teacher I understand the nature of the perceptual process." Seventy-six percent understood the perceptual process most of the time; while 8% indicated only sometimes; 16% are in doubt.

The summation of the questionnaire content and results were most notably indicative in response to the following statement: "As a Special Education Resource Room teacher I require aid to continue to work toward the development of each pupil's reading, study, and visual perceptual skills." Eighty percent of the respondents admitted deficiencies in overall consolidation of subject matter while 20% required help most of the time. Conflicting responses of basic content further enlighten the writer that the teachers are in need of aid in the perceptual instruction area.

In summation, the survey provided convincing evidence of the writer's belief that the Special Education Resource Room teachers require aid in curriculum activities selection, addressing individual perceptual deficiencies, and in consolidating visual perception and oral reading instruction.

Results of the Metropolitan Achievement Test, state-wide distribution, show that the writer's district, as well as the two largest cities in the state, fall below national and state norms.

The total reading scores are not apropos to this practicum. The thrust of this writer's practicum was that of improving perceptual performance. However, the primary reason for citing the Metro scores is to further exhibit that the problem does exist in that reading scores of the Special Education pupils have not grown since the visual perceptual deficits have not been addressed.

In the Fall of 1986, the ten subjects of this study were at the reading readiness level. The Metro scores of the Spring 1987 testing, still show the same ten pupils to be at the reading readiness level, even though these subjects were exposed to a full year of first grade activities.

All Special Education pupils at the second grade level, the present level of the pilot group, were deficient in the following areas according to the reading diagnostic tests: recognizing and blending common word parts, giving letter sounds, naming capital letters, and naming lower-case letters. Deficiencies were also noted in: recognizing the visual form of sounds, initial letters, final letters, and vowels. These are all vital components in the basic skills foundation.

A further cause of the problem was identified. In the Individual Educational Plan (IEP), the Special Education Resource Room teachers have failed to include perceptual techniques to address the needs of perceptually impaired pupils. The IEP is composed of a Basic Plan which is completed at time of testing by Child Study Team personnel. This portion of the IEP does include

remedial/corrective techniques designed for perceptually impaired pupils.

The second portion of the IEP is the Instructional Guide. This is completed by each resource room teacher at time of pupil placement. This portion of the IEP does not include remedial/corrective techniques designed for perceptually impaired pupils; although it should.

Causative Analysis

The problem of pupil academic deficiencies in not addressing their visual perceptual delays was due to the fact that the teachers required aid in perceptual activities selection and consolidation of such into oral reading teaching strategies. The Special Education teachers apparently operated under the assumption that learning disabled pupils would automatically learn to read when the words were presented to them. This system may have worked, on a limited basis, through the use of context clues and memorization. Yet, the reading and basic skills foundation was weak and unable to support higher processes and word attack skills. The perceptual deficits, left unaddressed, remained; and the pupils lacked the skills necessary for academic growth. These facts were garnered through informal conferences.

A second major cause of this problem was the lack of definite quality lesson planning. Simply distributing worksheets which haphazardly address a portion of a perceptual deficit is not establishing a vital resource room program. Each teacher

required aid in the establishment of a program geared for the perceptually impaired. And each teacher must be knowledgeable in sustaining this program. Required provisions must be made by the teacher to modify the program to best meet each individual need. It is only in this manner that the teacher of the perceptually impaired can insure that each pupil will overcome perceptual deficits to insure his intellectual development.

A third cause of the problem related to non-achievement of the perceptually impaired was in teacher inability to choose proper activities; namely software. While the writer's district has an abundance of commercial software, the teachers are not skilled as to what deficiencies require attention and by what educational means. A teacher unaware as to what perceptual activities to seize is depriving the pupil of an important opportunity to learn.

A fourth cause of the problem was time demands faced by the Special Education teachers. Since the state requires the teachers to be responsible for teaching reading not taught by the regular home base teacher, in addition to addressing special needs, the resource room teacher felt overwhelmed. To overcome this frustrated teacher feeling and overcome pupil disability, aid was required by this writer to solve the time frame factor and proper activity consolidation.

In addition, many Special Education teachers were unaware of the various areas of perceptual abnormalities. They required a working model which identified disability areas, identified the

required activities which address disability area remediation, and consolidation of a successful program from which to emulate. This writer proposed to fulfill all of the above components.

The Related Literature

A review of the related literature revealed the versatility of computer assisted instruction (CAI) applicable in the educational setting. Learning disabled pupils with auditory, visual, perceptual and emotional liabilities have been serviced through CAI in order to improve perception, basic skills, language arts, reading, and arithmetic to which the literature will attest. Inherent qualities as self-confidence and coping skills have been measured and raised to levels which would then foster academic success through CAI.

While experiments have been successful in improving auditory and visual perceptual abilities, the writer is aware that he is trodding virginal territory in assessing pupil perceptual performance in five designated areas crucial to foundation development. This writer is further convinced that CAI is an innovative educational avenue specifically tailored for the learning disabled who are further straddled with deficient self-concepts.

The following literature is fully pertinent to CAI; yet, various disciplines are discussed.

With the advent of emerging technologies linked with computer assisted instruction, it is becoming essential for school districts to improve instructional techniques. The writer

believes that the Special Education segment of the school population is a forgotten segment. In the writer's district, CAI is daily employed to service the gifted and talented populace at the elementary level. To date, the perceptually impaired or learning disabled pupils have not been consistently exposed to CAI through an intensive software program suitable for correcting auditory and/or visual-motor deficiencies.

The writer was intent in searching for successful yet creative means of teaching the perceptually impaired in a resource room setting. The district schools have sufficient computers and software; yet little administrative or supervisory effort is expended in either working with the perceptually impaired through CAI or aiding teachers seeking CAI adeptness. Therefore, a literature review relevant to CAI and special subject areas was of primary interest. The writer's district now has evidence that CAI can be effectively employed in servicing the learning disabled and, too, that success is met when Special Education teachers are trained to deal with perceptual deficits through CAI.

Weisgerber and Rubin (1985) designed and organized a prototype software package catering to the perceptual needs of learning disabled pupils. The target group were pupils deficient in letter shapes and letter combinations. Practical guidelines are offered to help the teacher integrate microcomputers into a resource room environment for learning disabled pupils. Microcomputers, when properly employed, enable the learning disabled

to retain letter shape and combination mastery.

Goodman (1983) employed a microcomputer without commercial software in servicing elementary learning disabled pupils. Their perceptual abilities rose sharply with consistent use of activities geared for the perceptually impaired. Goodman advocated computer assisted instruction in dealing with pupils below grade in oral reading skills.

Male (1986) stressed the benefits of employing cooperative learning activities in conjunction with computer assisted instruction. She further reports the vast potential in skill development for mainstreaming pupils when teachers are trained and aware of their role in the teaching process of perceptually impaired pupils. When teachers cooperate with each other in respective disciplines, pupils benefit and there is a transfer of knowledge and reinforcement in the mainstreaming program, concluded Male.

Boettcher (1983) described her data on a computer-based reading comprehension program. Her pilot study comprised learning disabled pupils in grades 4 through 9. She found growth in five skill areas: semantics, syntax, relationships, inferences, and interpretation. Pupil attitude was enhanced in these positive results.

Pournelle (1985) had researched diverse methods in teaching the learning disabled. He advocates employing computers, software, and peripheral equipment in the teaching strategy. More particularly, in teaching dyslexic children to read, Pournelle

discusses the use of voice synthesizers and speech software; employing human readers to translate that which appears on the screen; utilizing word processing functions and employing microcomputers to control tape recorders.

Torgesen (1986) narrated that learning disabled pupils are limited in higher skill acquisition. When exposed to computer assisted instruction, however, their decoding skills improve through repetition. Previously, the benefits of microcomputer technology were unavailable to them. Presently, computer software and peripheral equipment aid children with reading and perceptual difficulties. Human readers are employed to translate screen operations utilizing word processing functions. Positive test scores were the result of long range retention of acquired skills.

Clements and Gullo (1984) investigated the effects of computer programming on 6-year-old children's cognitive style, metacognitive abilities, cognitive development, and the ability to describe directions. Posttesting revealed that the computer programming group scored significantly higher on measures of reflectivity and on two methods of divergent thinking; whereas the CAI group showed no significant pre-to posttest differences. The programming group outperformed the CAI group on measures of meta-cognitive ability and ability to describe directions. On measures of cognitive development, though, no differences were found.

Murphy (1984) employed a language arts software program to

aid special needs children in Marblehead, Massachusetts. The pupils represented a range of learning disabilities and emotional, behavioral, and physical disorders of varying degrees of severity. The program had three major components, entitled "Nouns," "Verbs," and "Adjectives." These components encompassed both drill and practice sections and creative writing. The following general principles applying to special needs children were incorporated in the program: individualization, personalized instruction, repetitions of principles and vocabulary, self-paced activity, ease of use, positive response to answers, and hierarchy of skills in exercise design. The study included 30 second through sixth graders, evenly divided between an experimental and a control group. Language sections of McGraw Hill's Comprehensive Tests of Basic Skills (CTBS) were used as pretest and posttest measures of academic change, while the Coopersmith's Self-Esteem Inventory and anecdotal data recorded feelings of self-worth before and after intervention. Of the four areas addressed in the study through the CTBS testing, two met expected gains (vocabulary and spelling) and two did not (language mechanics and language expression). The experimental group showed an increase of 3.07 points on the Self-Esteem Inventory, while the controls registered a decrease of 1.20 points. Case studies and charts indicating each child's academic and affective gains were provided.

Gill (1984), in her doctoral internship program, reviewed the implementation of computer programs in special education in

the District of Columbia Public Schools. She describes specific applications at the Prospect Learning Center, a special elementary school for moderately to severely learning disabled pupils. Positive results were measured in the application of basic skills retention and transfer in the moderately learning disabled through consistent microcomputer use.

Saracho (1981) recommended that computer assisted instruction be used for teaching reading, language arts, mathematics to children who have difficulty achieving basic academic skills. Districts within the United States which service bilingual pupils have noticed a surge in interest and achievement when pupils are exposed to microcomputer technology. Pupils with learning disabilities are able to work at a tailored pace thus cementing a basic skills foundation. Spanish-speaking migrants are initially intrigued by microcomputer technology; this intrigue tends to blossom into a positive outlook toward schooling. A positive correlation, too, existed between the length of time spent on the computer and gains in reading, language arts, and math.

Maddux (1984) discussed two uses of microcomputers for the learning disabled. An initial use relates to conflicting traditional assignments more efficiently. The second use involves learning disabled pupils with computer programming, particularly LOGO, and the use of simulation and word processing programs. Maddux claims that computers bolster learning through feedback and reinforcement. Lowered frustration, motivation, and opportunity for success are positive by-products in the introduction of

microcomputer technology. Frustration is conquered since each pupil is permitted to progress at his own rate; thus immediate feedback produces correct reinforcement.

Cosden (1987) completed an observational study of micro-educational environments and microcomputer use within these environments. The study was conducted in special day classes, resource rooms, and mainstream classroom settings. Cosden found that mildly handicapped pupils in special education settings had less variety to their instructional experiences than did either handicapped or non-handicapped children in mainstreamed settings. Resource room pupils scored higher in math and reading on a daily basis than similar counterparts not exposed to microcomputers. Addressing the uses of motivation and individual attention, Cosden contends that special education pupils can overcome handicaps with consistent computer use.

Carmichael et al (1985) examined the creative uses of computers in elementary schools and their impact on pupil's confidence and self-esteem, pupil-pupil interaction, pupil-teacher interaction, male and female pupils, classroom management, the role of the teacher, special education, teacher training, teachers not involved in the study, and curricular areas such as computer literacy, learning Logo as a programming language, problem-solving and problem-creation, mathematics oral communication, reading and writing, the arts, and values and the individual and society. Findings are based on intensive examinations of real classrooms over a 2-year period. A total of 433 pupils in 18 classrooms

that involved 13 different teachers were studied; of these, 5 teachers and 40 pupils were involved in the study for 2 years. Classrooms had 1 to 5 computers over the entire school year, or children had access to a computer laboratory. Logo and word processing were studied extensively; the use of a graphics tablet and Musicland were explored for short periods. Findings indicate that the creative use of computers fosters the development of independent and original thinking and that an environment that encourages exploration leads to extensive social interaction among all pupils; in addition, children become more willing to express, refine, or revise their ideas. A significantly greater proportion of children experienced an increase in their confidence and self-esteem if their teacher was able to give them autonomy over their learning. The impact on the learning disabled students' attention span and cognitive development in the special education classes was also significant.

McConnell (1983) reports that computer assisted instruction (CAI) significantly improved the math skills of elementary school children, according to the results of an experiment conducted by the Pasco (Washington) School District. The experiment was designed to determine whether CAI would improve student math performance and whether CAI would improve math performance more than a less expensive alternative program. During two semesters, approximately 500 pupils in grades 3-6 received one of three math treatments: CAI, the alternative paper and pencil drill and practice program, or the regular district math curriculum. While

all three treatments brought children from below to above age grade norms in total math. CAI improved the learning of total math and computational skills significantly more than the other two treatments. The regular curriculum was more successful in improving concept application skills. CAI was most effective at the third grade level and least effective at the sixth. CAI was also very effective for children enrolled in special education and remedial programs, for migrant children, and for children with limited English proficiency. A positive correlation existed between length of time spent on the computer and gain in math performance. A high and consistent correlation also existed between grade equivalent ratings on standardized tests and those ratings derived from the computer.

Chiang (1986) documents that three male and three female fourth-grade learning disabled pupils received microcomputer assisted instruction in multiplication. The results indicated mean gains of 4.7 and 6.1 facts per minute for girls and boys, respectively. These scores were obtained after 12 days of computer drill. Chiang claims that results suggest transfer of learning to conventional paper-and-pencil tasks.

Van Lieshout (1986) narrates the construction of two training procedures in servicing children with learning deficiencies. Pupils in the first experiment were taught to work systematically through the problem task while paying close attention to several vital problem text components. Effective results were gained through training procedures.

In the second experiment the learning disabled were taught to draw a diagram as an external representation of the problem. Diagrams reflected properties of "change," "combine," and "compare" problem types. This training method appeared equally as effective. The visual-auditory-kinesthetic techniques which could be realized by computer instruction aided the learning disabled in long range retention of basic arithmetic processes.

Watkins and Webb (1981) related positive findings on the effectiveness of computer assisted instruction with 28 elementary learning disabled pupils. A matched control group that received traditional special education instruction on Apple microcomputers scored significantly higher. This instruction was presented as a tool for helping pupils learn to successfully solve word problems.

Elkins (1985) reported that teachers and teachers' aides with prior computing experience were positively affected in accepting and implementing computer technology. These personnel were from a large midwestern school district servicing learning, mentally, and emotionally disabled pupils. The growth rate of special education pupils was less sporadic when teaching personnel exhibited a pervasively positive attitude toward microcomputer technology. Special needs children apparently sensed attitudinal qualities, thus enhancing assignment quality.

Furst (1983) lauds the versatility of the microcomputer in dealing with the emotionally handicapped. Furst, in working with learning disabled pupils, grades K-8, found that computer use

acted as a soothing effect on the emotionally disturbed. She further cites the microcomputer's contribution to the pupil population self-concept. They were able to work within emotional constraint guidelines; that is, complete a given amount of work according to a daily behavior pattern; which improved markedly.

Mokros and Russell (1986) assessed the extent to which special educators are moving beyond drill and practice software with learning disabled and emotionally disturbed pupils. In a survey of 50 school districts, Mokros and Russell identified factors preventing or discouraging application beyond drill and practice. The trend is toward catering to individual needs. The authors describe the most recent innovations and advancements in computer software, peripheral devices, and enhancements. Captioning, electronic devices, and computer language are mentioned which aid the learning disabled in achieving higher and lasting academic results than those exposed solely to traditional teaching.

Naiman (1983) explored three types of computer applications. Special purpose equipment exists for those with a particular physical handicap as: microcomputer technology for the visually impaired. Electronic braille and the Optacon Print Reading Systems are appropriate. Naiman mentions that standard equipment can be easily modified and converted into software to service physically, mentally, and emotionally handicapped children.

Adams and Fuchs (1986), while addressing considerations related to special education computer use, contend that computer

assisted instruction enhances the self-confidence factor in pupils with special needs. Computers are further valuable in teaching coping and social skills to learning disabled pupils. These skills are paramount, contend Adams and Fuchs, in long range retention of the basic skills. When the foundation is secure, special education pupils learn and retain at a greater rate via CAI than those pupils not exposed to microcomputers.

In conclusion, a review of the literature exhibited the versatility and vitality with which CAI can impact the learning process. The field of special education is still the step-child in the entire educational family; therefore, it requires attention and further exploration. Trained personnel dealing with the exceptional child can facilitate his total development thereby scheduling school days with meaningful activities and experiences. The literature was prolific in studies employing CAI in traditional subject areas; namely, Language Arts and Mathematics. Basic skills retention, enhanced self-image, and eye-motor coordination improvement are enriched through CAI.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Statement of General Goals

It is imperative that perceptually impaired pupils function successfully in the mainstream setting. As a result, the primary goal of this practicum was to establish a functional and reliable perceptual activities program, through CAI, from which the Special Education elementary level, resource room teachers can emulate. The developmental areas include: visual-motor coordination, figure-ground differentiation, form constancy, position in space, and spatial relationships.

The following specific behavioral objectives were chosen for this Practicum:

1. Over a period of 12 weeks, the Perceptual Quotient of ten Perceptually Impaired pupils will improve by five points, from pretest to posttest as measured by the Frostig Test of Visual Perception.
2. Over a period of 12 weeks, ten Perceptually Impaired pupils will be able to successfully identify, cut and paste a human figure outline drawing onto another sheet of paper as measured by Frostig worksheet human figure drawing.

3. Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully identify, cut and paste one triangle and one square from a group of geometric designs onto another sheet of paper as measured by Frostig worksheet.
4. Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully identify, by placing a small X in pencil, two circles of the same size while viewing a picture of a circle, from a group of printed geometric designs of different shapes as measured by Frostig worksheet.
5. Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully assemble features and wooden body parts as: arms, legs, feet, hands, neck, head, eyebrows, eyes, ears, nose, and mouth onto a body outline as measured by Human wooden figure 12" size.
6. Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully string a pattern consisting of two orange beads, one red block, two blue beads, one yellow block, two red beads, one blue block, two green beads, one orange block, two white beads as measured by a commercial assortment of beads and blocks.

Evaluation Instruments

The first objective was measured by The Marianne Frostig Developmental Test of Visual Perception in its entirety. The remaining five objectives were measured by employing parts of

the aforementioned testing instrument. These worksheets were modeled after the Frostig worksheets and were teacher-made. This writer had chosen the above since the test construction was preceded and accompanied by several years' observation of children who were referred to the Marianne Frostig School of Educational Therapy, located in Los Angeles, California, because of learning difficulties. A large number of the children had been diagnosed as having minimal brain damage, but whatever the diagnostic category, most of the children were found to have visual or auditory perceptual disturbances as measured by such tests as the Bender-Gestalt, Goodenough, Wepman Test of Auditory Discrimination, and tests of aphasia.

Disturbances in visual perception were by far most frequent symptoms and seemed to contribute to the learning difficulties. Children who had difficulty in writing seem to be handicapped by poor eye-hand coordination, and children who could not recognize words often seemed to have disturbances in figure-ground perception. Other children were unable to recognize a letter or word when it was written in different sizes or colors, or when it was printed in upper-case print and they were used to seeing it in lower-case. It was postulated that these children had poor form constancy. The school noticed that many children produced letters or words in "mirror writing." Such reversals or rotations indicated a difficulty in perceiving position in space, while interchanging the order of letters in a word suggested difficulties in analyzing spatial relationships; as well as indicating

the possibility of auditory perceptual difficulties. As a rule, these latter children could neither read nor spell longer words. It was also observed that many of the children with evident disabilities in visual perception had difficulty in paying sustained attention and/or showed behavioral deviations.

Marianne Frostig attempted to construct a test to explore further the development in these five areas of visual perception, postulating, on the basis of experience, as well as findings of others, such as Thurstone (1944), Wedell (1960), Cruickshank (1957), that each of the five abilities developed relatively independently of the others, and that there should be specific relationships between them and a child's ability to learn and adjust. It was never believed that these five visual perceptual abilities were the only ones involved in the total process of visual perception, but they were conceived to be important parts of the process, seemed to have particular relevance to school performance, and were therefore studied.

Mechanism for Recording Unexpected Events

In planning a project lasting for an extended time frame, this writer provided for unexpected occurrences. The author kept a weekly log (see Appendix D) for each of the ten pupils involved in this project. The log recorded a summary of the strengths and weaknesses which occurred daily. These success-failure features were reviewed each week in order to insure that each pupil progressed according to ability level.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Possible Solutions

Addressing auditory and visual perceptual deficiencies in the learning disabled is a task performed with inherent results. A Special Education teacher, servicing the perceptually impaired, will never realize the hurdles these pupils master once a basic skills foundation is solidified. Perceptual abnormalities are blockages in a pupil's quest for success. Once these deficiencies are diagnosed and cured a pupil will achieve success in school commensurate with chronological age and ability level.

While the literature review disclosed a plethora of CAI techniques and software guidelines, none were replete with an appreciable time span study nor more than two perceptual-related objectives. The writer was able to learn colleague techniques--strengths and weaknesses encountered during individual studies, but this only renewed his determination to develop a workable program from which his district could benefit.

Even though this writer is a neophyte in structured study initiation, he is convinced that his general goals should be carried through in his chosen manner. The following studies were useful in the writer's program development.

Pupils deficient in letter shapes and letter combinations were the target group of Weisgerber and Rubin (1985); yet this

was only one area measured by the authors. This writer did benefit from their suggestions pertinent to CAI--resource room integration. This knowledge that microcomputers must be properly used and coordinated with goals has always been the philosophy of the writer. Weisgerber and Rubin endorsed daily, consistent computer practice for basic skills retention.

Teachers require CAI training, not only in subject matter but in nuances related to pupil attitudes, fears, and struggles. There is a vast skill development potential with proper training for both pupil and teacher. Inter-disciplinary cooperation is essential and consistent computer usage aids activity retention in the learning disabled. (Boettcher, 1983; Goodman, 1983; Male, 1986).

Numerous studies (Gill, 1984; Murphy, 1984; Torgesen, 1986) state that visual decoding skills, self-concept improvement, and linguistic expression levels are raised through CAI. Basic skills retention and transfer techniques are positive CAI results; most notably in the moderately learning disabled pupils. Fournelle (1985) reports that dyslexic children experience success in decoding skills through CAI. Their reports are noteworthy insofar as they identify a surge in the attitude of the learning disabled. Pupils with academic deficiencies have poor self-images since success is always elusive in education. This writer had chosen interesting and animated software in an attempt to improve attitude and success in the perceptually impaired whom he had serviced.

The writer had aimed for instructional methods which would foster a basic skills foundation. The literature was replete in lauding CAI for teaching reading, language arts, and mathematics. There are advantages in using teacher-made worksheets in concert with CAI and employing software to service Spanish-speaking pupils. Children in the writer's pilot group were bilingual. These studies indicated that bilingual children were inclined to show an increase in reading levels. (Cosden, 1987; Maddux, 1984; Saracho, 1981).

McConnell (1983) reported a positive correlation between length of time spent on the computer and math performance gains. If there is a daily CAI consistency, pupils with limited language proficiency retain more in mathematics than those children who are exposed only to paper and pencil drill. The writer found this information useful as many perceptual deficits are exhibited in the area of mathematics; specifically, reversals of digits and irregular column addition.

Mokros and Russell (1986) endorse learning games as a positive alternative to simple drill and practice in all subject areas. This writer, aware of the benefit of learning games with small children, had chosen his software to include such as he believes that game-like activities arouse pupil curiosity.

Adams and Fuchs (1986) tout the importance of game-like activities in long-range retention of basic skills. This is to be incorporated into a total program. Over-use and heavy reliance of games is detrimental to the learning process

(Carmichael et al, 1985).

Description of Selected Solution

The solution to the problem of perceptually impaired pupils neither receiving perceptual training techniques nor having their visual perceptual deficits addressed was based on the methods and strategies of identifying and teaching perceptual development described in earlier sections of this paper.

The five areas from which methods and strategies were selected are: eye-motor coordination, figure-ground differentiation, form constancy, position in space, and spatial relations. These areas of the solution were chosen as this writer believes that a lack of integrity of the nervous system is most clearly expressed in the main developmental task during any phase of development. The development of perceptual skills is a child's main developmental task between 3 1/2 and 7 1/2 years of age, when judgement and intellectual development supercede. Clinical case studies show that children with severe perceptual disturbances are often unable to overcome their perceptual handicaps sufficiently by intellectual means to progress satisfactorily in their academic learning.

The selection of CAI incorporates visual and auditory modalities simultaneously, thus deficit areas become strengthened through daily usage in a structural activity assignment environment.

The Special Services Department of the writer's district

recognized the vital need for a perceptual activity development program. The Special Education teachers are neither concentrating nor making a conscientious effort to incorporate perceptual remediation techniques into the resource room program. The result of this aforementioned malady is that the Perceptually Impaired pupils are not exhibiting sufficient reading growth nor are a sufficient amount of pupils exiting the program after having spent three years with Special Education instructors.

The literature search did not disclose evidence of any program specifically addressing the five perceptual areas mentioned frequently throughout this program. Rather, the literature search simply revealed a number of suggestions which could be employed in addressing the needs of the perceptually impaired through CAI. Therefore, the writer proposed to develop a perceptual skills activity program from which the Special Education personnel in his district may model their teaching strategies. The writer believes that a workable model will benefit both pupils and staff rather than a singular list of suggested activities.

Report of Action Taken

The solution employed in this practicum involved ten perceptually impaired, second grade resource room pupils. All pupils are considered to be below grade level in reading and math. All pupils are deficient in basic skills. These class-level designations are based on results of the most recent

Metropolitan Achievement Test, administered in the Spring, 1987.

The solution strategy began with an introductory phase. The initial component of the introductory phase was to administer the Marianne Frostig Developmental Test of Visual Perception. Test administration took the first two days of week one. The purpose of this testing instrument was to attain a pretest Perceptual Quotient. (see Appendix D) The perceptual quotient is a deviation score obtained from the sum of subtest scale scores after correcting for age variation. The subtest scale scores are obtained from each of these five areas: eye-motor coordination, figure-ground differentiation, form constancy, position in space, and spatial relations. For each age group, the perceptual quotient has a median of 100. According to Frostig (1963) it was found empirically that for the test as a whole the perceptual quotient is a better prognostic indicator than the perceptual age. The perceptual age shows the developmental level of a child but not in relation to his chronological age, and therefore does not indicate his ability to profit from the customary learning situation in school. It seems plausible that a child who is retarded in his perceptual abilities does not profit from everyday experiences as much as a child with normal perception, and will continue to show this characteristic also in the school situation. He will tend, therefore, to evidence learning difficulties even after he has reached the perceptual level necessary for beginning academic learning (a perceptual age of 6 to 6 1/2 yr. on each of the subtests).

A second component of the introductory phase was a class explanation and discussion of computer usage. This was a brief explanation as the pupils were exposed, during the first grade, and on a weekly basis, for one period, in basic computer technology. All of these ten pupils were also exposed to CAI during summer school for addition and subtraction review. This occurred the last two days of week one.

The final component of the introductory phase of the solution strategy was a teacher-led discussion centering on the importance of perceptual activities. Pupils were graphically shown in this conversation-lecture as to why, for example, they confuse "6" with "9" and "saw" with "was".

Upon the completion of the introductory phase of the solution strategy, the perceptual activity phase commenced during the second week of the first month and lasted the entire month. The first part of the perceptual skills acquisition program concentrated on concepts of direction, such as up/down, left/right, over/under and above/below. This portion of the program was designed for beginning readers as all ten pupils are at this level. Counting skills as well as number and geometric design identification will be drilled. Lower and upper-case letter identification with mixed colors (hues) and sequencing of such will be further included.

The next procedure included in the program featured simple commands to reinforce keyboard dexterity (e.g. "U" for "up", "P" for "purple", "A" for "another"). The association

of initial sound to a letter on the keyboard will strengthen eye-motor coordination. Printed cue cards with graphic explanations will enable each pupil to proceed independently on geometric shape and size activities. This procedure will commence the first week of the second month.

Upon the completion of the introductory phase and during the perceptual activity phase implementation, the author was in the process of completing a weekly log. (see Appendix D) The purpose of the weekly log was to summarize successful and unsuccessful acquisition methods during the week. In addition, the log afforded the opportunity for the author to record any teacher or pupil concerns. A cursory log review will remind the author of activities to be either incorporated or avoided in further skill initiation and reinforcement.

Visual discrimination and classification skills were introduced as pupil proficiency attains a satisfactory level during the third month. The writer experimented with software samples as they were received by the CAI department. This CAI department acts as a clearinghouse for all CAI materials. It classifies software and distributes selected software to other buildings. The rest of the remaining CAI is retained in a central location to which the author has daily access.

The final phase of the program was that of evaluation at the end of twelve weeks. The pupils administered the Marianne Frostig Developmental Test of Visual Perception in order to measure Perceptual Quotient growth. A five point growth from

pretest to posttest was expected in each of the ten involved pupils. Each of the five previously noted perceptual areas were measured by employing portions of the Frostig program. This phase of the program lasted one week. Abstract dissemination consumed up to two weeks.

CHAPTER V

RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Results

Objective One was measured by the Frostig Test of Visual Perception. The complete Perceptual Quotient table may be found in Appendix C. The specific objective, "Over a period of 12 weeks, the perceptual quotient of ten Perceptually Impaired pupils will improve by five points, from pretest to posttest as measured by the Frostig Test of Visual Perception," was met by eight of the ten pupils. Three pupils improved their Perceptual Quotient scores by five points. Five pupils improved their Perceptual Quotient scores by more than five points; three pupils by one point and two pupils by two points. Two pupils failed to improve by five points.

The concept of a perceptual quotient requires explanation. First, because the similarity between the terms of PQ and IQ may lead to a misconception of the PQ as a measure of a fixed ability. This is often the way the IQ is understood. Thus, a low intelligence quotient is accepted as a valid explanation of why a pupil cannot progress in learning. Such treatment of the findings in a perceptual test would be of no help to the pupil. A low PQ indicates not only low visual perceptual ability, but also that help is required. The writer's experience indicates that such help can often be given, and given successfully, in the

form of perceptual training. Thus, the PQ should not be regarded merely as a new label. The use of any unitary measure of perceptual function may suggest that it expresses some common trend or factor. But the five subtest scores are based on the assumption that essentially five different and relatively independent abilities are tested and may subsequently be differentially trained. The test's diagnostic value would be restricted if only the total PQ were reported; hence other objectives were measured.

Testing of these different abilities not only permits the measuring of specific assets and liabilities but also allows the exploration of the relationships between these abilities and school achievement. Moreover, the relationship of these abilities to each other and to various personality measures may prove to be of diagnostic significance. Objective Two was measured by a teacher-made test as it involved visual motor coordination and required observation during the process of task completion. The specific objective, "Over a period of 12 weeks, ten Perceptually Impaired pupils will be able to successfully identify, cut and paste a human figure outline drawing onto another sheet of paper as measured by Frostig worksheet human figure drawing," was met by eight of the ten pupil participants. See Appendix D (A) for the pretest and posttest results.

Visual-motor coordination is the ability to coordinate vision with movements of the body or with movements of a part of parts of the body. Examples of this activity can be observed daily as: getting dressed, carrying a cafeteria tray, entering a

motor vehicle, and simply sitting down. Results of this disability are seen in the failure to perform required everyday tasks as: riding a bicycle, kicking a ball, cutting, pasting, drawing, and writing from a book model or wall chart. Poor social relations and self-concept are affected, too.

The third objective, "Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully identify, cut and paste one triangle and one square from a group of geometric designs onto another sheet of paper as measured by Frostig worksheet," was met by eight of the ten pupils. The assessment instrument, as for the other objectives, was administered at the beginning and end of the implementation period. See Appendix D (B). No pupil was able to complete the requirement during the pretest segment. Eight pupils were able to successfully complete the objective at posttest time. The writer is pleased with this number as figure-ground perception is vital to a readiness skills foundation. The figure is that part of the field of perception that is the center of the observer's attention. When the observer shifts his attention to something else, the new focus becomes the figure. A disability result would be incorrect letter formations, skipping of lines or sections, and a pervasive tendency to lose one's place. A child tends to be inattentive and disorganized because attention shifts to any stimulus that intrudes upon him.

Objective Four was an exercise that could be readily observed. This test results of this exercise may be found in

Appendix D (C). The specific objective, "Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully identify, by placing a small X in pencil, two circles of the same size while viewing a picture of a circle, from a group of printed geometric designs of different shapes as measured by Frostig worksheet," was met by all ten pupils. This was the singular objective with perfect execution by all in the pilot program. Form constancy is the ability to perceive an object as possessing invariant properties; such as shape, position, and size in spite of various settings. The primary ingredients are size, brightness, and color. Disability results refer to anxiety due to general unreliability of appearances in the pupil's world as words, letters, symbols, and digits. A superb training technique to overcome form constancy deficiencies is linked with experiences to gain familiarity with simple shapes and ranges of size and to identify them in complex settings as: finding the same size or different sizes, sorting according to size and shape, and exercises with two and three dimensional planes.

Objective Five involved a puzzle (human figure). See Appendix D (D) for pre and posttest results. The specific objective, "Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully assemble features and wooden body parts as: arms, legs, feet, hands, neck, head, eyebrows, eyes, ears, nose, and mouth onto a body outline as measured by Human wooden figure 12" size," was met by six of the ten pupils. This objective is related to the ability to perceive the relationship of an object

to one's own body; behind, before, above, below, to the side. After a ten minute time span, four of the pupils still experienced failure in completing the entire objective. Disabled children in this perceptual area have a distorted visual world; clumsiness and hesitancy in performing movements, difficulty in understanding words designating spatial position such as in, out, up, down, before, behind, left, right. Reversals, too, are prominent as: "b" as "d", "p" as "q", "on" as "no", "24" as "42".

The writer had also noted that these pupils did experience difficulty in drawing human figures. Even though grooves were inherent to the human figure, pupils mistook arms for legs initially. Salient head features were overlooked initially. The writer believes that the pupils require training in the following areas: directional body movements, drawing human figures, completion of partially drawn features, assembling body parts, and exercises with two and three-dimensional objects.

The final measurable objective may be found in Appendix D (E). This specific objective, "Over a period of 12 weeks, ten Perceptually Impaired pupils will successfully string a pattern consisting of two orange beads, one red block, two blue beads, one yellow block, two red beads, one blue block, two green beads, one orange block, two white beads as measured by a commercial assortment of beads and blocks," was met by eight of the ten pupils. Spatial relationships is the ability to perceive the position of two or more objects in relation to one's body. The inability to perceive proper sequence of letters in a word,

arithmetic processes, understanding graphs, map reading, and measurement are the results of a spatial relationship disability.

Training a pupil in this area can enhance enjoyment and eliminate criticism and pressure. Suggested activities are: simple models, crafts, following a pattern, and sequential activities. Exercises involving three dimensional objects (positions and patterns) strengthen spatial relationships ability.

Conclusions

The first objective, that of improving the perceptual quotient, was met within the established guidelines as evidenced by the data presented in the previous section. The variety and the integration of employed software is credited for such positive results. The remedial activities were planned so that each child clearly understood what was to be accomplished within a given time period. Perceptually impaired pupils require problem-solving procedure guidance as well as listening and analytical skills.

If a software activity included a rabbit or a bear then the writer provided toy rabbits and bears prior to the lesson. The writer subscribes to an educational rationale for such an activity. Since tactile discrimination and sensory integration are primary to higher level perceptual and cognitive learning, all preschool, primary, and remedial education programs should

provide systematic training in these areas.

Boettcher (1983) believes that many learning and problem-solving situations require directional orientation; hence, it is vital that these skills be specifically taught. Such instruction should begin with body orientation, and proceed to object relationships and concrete applications (Frostig, 1963; Maddux, 1984).

The pupils were particularly enthusiastic during the unicycle ride with Kermit the Frog. This software aided in laterality development and in time orientation. McConnell (1983) reports that lateral consistency in body orientation to problem-solving situations reduces psycho-motor conflict and furthers sensory-motor integration and learning. Where gross inconsistency and neurologoical immaturity exist, training programs should reinforce laterality and help to establish habitual modes of responses (Myklebust, 1978).

Body organization in time reflects sensory-motor integration in space and is prerequisite for advanced perceptual and cognitive skills. Children should be provided with opportunities to explore and judge space-time relationships in order to develop synchrony of movement (Cratty, 1980).

The second objective is related to visual coordination and pursuit. It is the ability to follow and track objects and symbols with coordinated eye movements. The writer attempted to choose software in order for pupils to successfully attend to sequentially arranged symbolic learning. Children should be

provided with systematic instruction in visual coordination and ocular control activities (Johnson and Morasky, 1980).

The third objective required reliable visual figure-ground differentiation. This is the ability to perceive objects in foreground and background and to separate them meaningfully. The differentiation of meaningful objects in the environment requires visual concentration, attention, and stability (Myklebust, 1978). The employed software aided pupils in skill training of visual scanning, peripheral discrimination of boundaries, and detecting significant details; pointing, matching, describing.

The fourth objective was that of visual-form discrimination. This is the ability to visually differentiate the forms and symbols in one's environment.

The ability to seek likeness and differences in one's environment is prerequisite to symbolic differentiation and interpretation as required in reading (Cratty, 1980). Basic educational programs should and did include opportunities to point out, indicate, and comment on the details and differences perceived in each pupil's visual field. They were required to match identical pictures and symbols such as abstract designs, letters, numbers, and words.

The fifth objective was to test visual-motor spatial-form manipulation. This is the ability to move in space and to manipulate three-dimensional materials. The perception of forms in space and the ability to judge motor skills required to manipulate objects relative to one another is basic to the solu-

tion of nonverbal performance problems encountered in everyday life (Cratty, 1980; Myklebust, 1983).

The sixth objective, spatial relationships, is the ability to learn visual-motor skills from repetitive experience. Johnson and Morasky (1980) state that pupils can respond with increasing speed to rote learning tasks such as copying digit and letter sequences, spelling, specific arithmetic processes, and gross motor skills such as jumping over a rope.

Most visual-motor skills can be improved through refined practice and drill (Cratty, 1980). The specific skill to be learned must be broken down into its component movements or processes and a systematic approach developed to accomplish the task to the point of overlearning (Myklebust, 1983). Both meaningful practice and drill must be utilized in order for the skill to be developed for functional use (Johnson and Morasky, 1980). Each skill measured in each objective was for the purpose of functional usage.

In conclusion, this practicum project did establish a functional and reliable perceptual activities program, through CAI, from which the Special Education elementary level, resource room teachers can emulate. Consequently, the writer intends to recommend the incorporation of the program into the Special Education primary level program to be taught in conjunction with oral reading skills.

For the teacher of children with learning disabilities it is important to know that perception is a learned skill. This

implies that the teaching process can have a direct impact on the pupils' perceptual skills. Once an evaluation of perceptual activities is made, appropriate teaching procedures can improve various subskills of perception or modify the learning process in the light of perceptual deficits.

Recommendations

The writer has three specific recommendations based on the results of this practicum. First, that the Special Education, primary level, resource room teachers incorporate CAI and the working model which addresses visual-motor perceptual deficits into their instructional program.

Second, that the Special Education primary level resource room teachers include goals which address perceptual deficiencies in their Instructional Guide (teachers' portion of IEP). Three, that the Special Education, primary level, resource room teachers employ the perceptual work sheets which are in the custody of the media specialists in each building. This should be a pencil and paper exercise in concert with the above mentioned perceptual program.

The writer believes that perceptual deficits will be addressed if the teachers follow the above recommendations. Pupils will be employing auditory, visual, and haptic (touch, sensation) modalities, thus changing liabilities into assets.

Dissemination

The results of this practicum project were shared via three avenues. Initially, practicum results were submitted to the Superintendent of Schools, who made it available to the assistant Superintendent of Special Services, which oversees the Special Education teachers. The writer is available to aid those teachers who will adopt his program.

Secondly, the writer submitted a copy of this practicum to the Special Education teachers in the school in which the practicum took root and grew. It will be placed in the teachers' room book case.

Finally, the writer submitted a copy to the Association of Learning Consultants in his state, of which he is an active member.

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APPENDIX A
TEACHER QUESTIONNAIRE

DIRECTIONS: SELECTED RESPONSIBILITIES OF THE SPECIAL EDUCATION RESOURCE ROOM TEACHER ARE LISTED BELOW. INDICATE BY CIRCLING THE APPROPRIATE NUMBER THE EXTENT TO WHICH YOU REFLECT EACH CHARACTERISTIC OR MEET EACH RESPONSIBILITY.

USE THE FOLLOWING RATINGS:

1. ALMOST ALWAYS
2. MOST OF THE TIME
3. SOMETIMES
4. SELDOM OR NEVER
5. UNDECIDED

AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I

- | | | | | | |
|---|---|---|---|---|---|
| 1. AIM VISUAL PERCEPTION INSTRUCTION TOWARD ACHIEVEMENT OF SPECIFIC GOALS | 1 | 2 | 3 | 4 | 5 |
| 2. ADAPT VISUAL PERCEPTION INSTRUCTION TO THE INDIVIDUAL LEVELS, ABILITIES, AND NEEDS OF ALL PUPILS | 1 | 2 | 3 | 4 | 5 |
| 3. USE DIAGNOSTIC-PRESCRIPTIVE APPROACH IN VISUAL PERCEPTION INSTRUCTION | 1 | 2 | 3 | 4 | 5 |
| 4. MERGE MATERIALS AND EQUIPMENT INTO A TOTAL PROGRAM | 1 | 2 | 3 | 4 | 5 |
| 5. UNDERSTAND THE NATURE OF THE PERCEPTUAL PROCESS | 1 | 2 | 3 | 4 | 5 |
| 6. LEAD PUPILS TOWARD ENJOYMENT IN VISUAL PERCEPTUAL ACTIVITIES | 1 | 2 | 3 | 4 | 5 |
| 7. EVALUATE PROGRESS IN READING AND VISUAL PERCEPTUAL ACITVITIES | 1 | 2 | 3 | 4 | 5 |
-

I REQUIRE AID IN:

- | | | | | | |
|---|---|---|---|---|---|
| 1. PLANNING AND SELECTING VISUAL PERCEPTUAL ACTIVITIES | 1 | 2 | 3 | 4 | 5 |
| 2. AWARENESS OF COMPUTER SOFTWARE MATERIALS, WHERE TO GET THEM, AND HOW TO ORDER THEM | 1 | 2 | 3 | 4 | 5 |
| 3. CONTINUE TO WORK TOWARD THE DEVELOPMENT OF EACH PUPIL'S READING, STUDY, AND VISUAL PERCEPTUAL SKILLS | 1 | 2 | 3 | 4 | 5 |

APPENDIX B
RESULTS OF TEACHER QUESTIONNAIRE

- 1 = ALMOST ALWAYS
- 2 = MOST OF THE TIME
- 3 = SOMETIMES
- 4 = SELDOM OR NEVER
- 5 = UNDECIDED

- (1) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I AIM VISUAL PERCEPTION INSTRUCTION TOWARD ACHIEVEMENT OF SPECIFIC GOALS.

1 - 20%
2 - 20%
3 - 60%
4 - 0%
5 - 0%

- (2) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I AIM VISUAL PERCEPTION INSTRUCTION TO THE INDIVIDUAL LEVELS, ABILITIES, AND NEEDS OF ALL PUPILS.

1 - 60%
2 - 24%
3 - 16%
4 - 0%
5 - 0%

- (3) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I USE A DIAGNOSTIC-PRESCRIPTIVE APPROACH IN VISUAL PERCEPTION INSTRUCTION.

1 - 0%
2 - 0%
3 - 28%
4 - 56%
5 - 16%

- (4) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I MERGE MATERIALS AND EQUIPMENT INTO A TOTAL PROGRAM.

1 - 28%
2 - 0%
3 - 20%
4 - 0%
5 - 52%

- (5) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I UNDERSTAND THE NATURE OF THE PERCEPTUAL PROCESS.
- 1 - 16%
 - 2 - 76%
 - 3 - 8%
 - 4 - 0%
 - 5 - 0%
- (6) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I LEAD PUPILS TOWARD ENJOYMENT IN VISUAL PERCEPTUAL ACTIVITIES.
- 1 - 76%
 - 2 - 20%
 - 3 - 4%
 - 4 - 0%
 - 5 - 0%
- (7) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I EVALUATE PROGRESS IN READING AND VISUAL PERCEPTUAL ACTIVITIES.
- 1 - 96%
 - 2 - 4%
 - 3 - 0%
 - 4 - 0%
 - 5 - 0%
- (1) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I REQUIRE AID IN PLANNING AND SELECTING VISUAL PERCEPTUAL ACTIVITIES.
- 1 - 12%
 - 2 - 68%
 - 3 - 20%
 - 4 - 0%
 - 5 - 0%
- (2) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I REQUIRE AID IN AWARENESS OF COMPUTER SOFTWARE MATERIALS, WHERE TO GET THEM, AND HOW TO ORDER THEM.
- 1 - 0%
 - 2 - 0%
 - 3 - 16%
 - 4 - 76%
 - 5 - 8%

- (3) AS A SPECIAL EDUCATION RESOURCE ROOM TEACHER I REQUIRE AID
TO CONTINUE TO WORK TOWARD THE DEVELOPMENT OF EACH PUPIL'S
READING, STUDY, AND VISUAL PERCEPTUAL SKILLS.

1 - 80%
2 - 20%
3 - 0%
4 - 0%
5 - 0%

APPENDIX C
PERCEPTUAL QUOTIENTS

PERCEPTUAL QUOTIENTS*

Subject	Pretest	Posttest
1	65	71
2	65	71
3	67	73
4	67	71
5	73	78
6	73	78
7	73	75
8	80	87
9	84	89
10	84	91

* The perceptual quotient is a deviation score obtained from the sum of subtest scale scores after correcting for age variation. For each pupil the perceptual quotient has a median of 100.

APPENDIX D
SPECIFIC OBJECTIVES TABLE

A. VISUAL-MOTOR COORDINATION

Task: Pupil can successfully identify, cut and paste a human figure outline drawing onto another sheet of paper.

Subject	Pretest	Posttest
1	No	Yes
2	No	No
3	No	Yes
4	No	No
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes
9	No	Yes
10	No	Yes

B. FIGURE-GROUND PERCEPTION

Task: Pupil can successfully identify, cut and paste one triangle and one square from a group of geometric designs onto another sheet of paper.

Subject	Pretest	Posttest
1	No	Yes
2	No	No
3	No	Yes
4	No	No
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes
9	No	Yes
10	No	Yes

C. FORM CONSTANCY

Task: Pupil can successfully identify, by placing a small X in pencil, two circles of the same size while viewing a picture of a circle, from a group of geometric designs of different shapes.

Subject	Pretest	Posttest
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes
9	No	Yes
10	No	Yes

D. POSITION IN SPACE

Task: Pupil is able to successfully assemble features and wooden body parts in proper grooved slots of body, head, and trunk.

Subject	Pretest	Posttest
1	No	No
2	No	No
3	No	No
4	No	No
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes
9	No	Yes
10	No	Yes

E. SPATIAL RELATIONSHIPS

Task: Pupil can successfully string a pattern consisting of two orange beads, one red block, two blue beads, one yellow block, two red beads, one blue block, two green beads, one orange block, and two white beads.

Subject	Pretest	Posttest
1	No	No
2	No	Yes
3	No	Yes
4	No	No
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes
9	No	Yes
10	No	Yes

APPENDIX E

WEEKLY LOG

CLASS PERIOD _____

WEEK _____

SUCCESSFUL METHODS:

PUPIL CONCERNS (concern, how expressed, when):

TEACHER CONCERNS (concern, how expressed, when):